



February 7, 2017

Ms. Diane McDaniel
Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

Mr. Griff Miller
USEPA Region 3
RCRA Corrective Action (3LC30)
1650 Arch St
Philadelphia, PA 19103

**Re: Raccoon Creek Groundwater Sampling Report
Fourth Quarter 2016
Former Lyondell Beaver Valley Site
Lyondell Environmental Custodial Trust
Potter Township, Pennsylvania**

Dear Ms. McDaniel and Mr. Miller:

On behalf of the Lyondell Custodial Trust (Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this letter to summarize the results of the Fourth Quarter 2016 Raccoon Creek Area groundwater sampling event at the Former Lyondell Beaver Valley site (Site) in Potter Township, Pennsylvania. The sampling event was conducted at the request of the Pennsylvania Department of Environmental Protection (PADEP) and the United States Environmental Protection Agency (USEPA). Tetra Tech completed the Fourth Quarter Raccoon Creek Sampling on November 21 and 22, 2016, in accordance with the approved 2016 Sampling Work Plan dated April 27, 2016 and the work plan addendum dated June 1, 2016.

GROUNDWATER SAMPLING SUMMARY AND RESULTS

Raccoon Creek flow conditions were documented on November 21, 2016 prior to sampling. The documentation included data from the on-site staff gauge, and available flow and water level data from the following USGS gauging stations located near the Raccoon Creek Area.

- USGS gauging station 03108000 at Raccoon Creek at Moffatts Mill, PA
http://waterdata.usgs.gov/usa/nwis/uv?site_no=03108000
- USGS gauging station 03108010 at Fishpot Run near Shippingport, PA (tributary to Raccoon Creek) http://waterdata.usgs.gov/nwis/dv/?site_no=03108010&PARAmeter_cd=00060
- USGS gauging station 03108490 on Ohio River above Montgomery Dam & Locks at Ohiovie, PA (downstream to Raccoon Creek on Ohio River but in the same pool as Raccoon Creek)
<http://waterdata.usgs.gov/usa/nwis/uv?03108490>

The staff gauge SG-1 indicates that surface of Beaver Creek was 682.24 feet above mean sea level is presented in Table 1.



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Graphs depicting the USGS gaging station data are included in Attachment 1. The USGS gauging information, indicates that Raccoon Creek discharge was below the seasonal median (Attachment 1; USGS station at Moffatts Mill).

Groundwater and light non-aqueous phase liquid (LNAPL) liquid levels were gauged with an interface probe. The liquid levels were recorded to the nearest 0.01 foot. The depth to groundwater ranged from 7.51 feet below the top of casing (btc) in MW-163S to 47.96 feet btc in MW-501D. LNAPL was present in MW-161 at a thickness of approximately 0.01 feet. The well gauging data is presented in Table 1.

A groundwater potentiometric contour map was completed for the November 2016 synoptic water level event. Figure 2 depicts the shallow groundwater potentiometric surface map for the November 2016 event. The November 2016, groundwater flow direction was southwest to south-southwest, away from and perpendicular to Raccoon Creek. The November 2016 surface water elevation in Raccoon Creek was higher relative to the potentiometric surface data in all wells measured in the Raccoon Creek Area. This suggests that Raccoon Creek is a losing stream in this area. The November 2016, groundwater flow direction is similar to previous gauging events.

On November 21 and 22, 2016, groundwater samples were collected from MW-120, MW-159, MW-160, MW-162, and MW-163S with a bladder pump, utilizing low-flow sampling techniques. The sample from MW-501S was collected using a peristaltic pump because a bent well casing prohibited the use of a bladder pump, and MW-161 was not sampled due to the presence of LNAPL. Field parameters were measured with Horiba Model #U-52 and recorded during purging and at the time of sample collection. The field parameters included pH, specific conductance, temperature, turbidity, and dissolved oxygen. A well was considered stabilized and ready to sample once three consecutive readings were within the following criteria:

Field Parameter	Stabilization Criteria
pH	+/- 0.1 standard pH unit
Temperature	+/- 3%
Specific Conductance	+/- 3%
Dissolved Oxygen	+/- 10%
Turbidity	+/- 10%
Oxidation-Reduction Potential	+/- 10 mV

The final field parameter readings are summarized in Table 2. Field data log sheets from the collected groundwater samples are presented in Attachment 2. Each sample was analyzed for the following:



TETRA TECH

- Benzene, Ethylbenzene, Toluene, and Xylenes (BTEX) using EPA Method 8260
- Target Analyte List (TAL) dissolved metals using EPA Method 6010 (7470 for mercury)

The samples were sent to TestAmerica Laboratories, Inc. in Pittsburgh, PA for analysis.

A summary of the analytical results is provided below. The analytical results are tabulated in Table 3 for chemical compounds detected in at least one well. Figure 3 depicts the chemicals of concern above Pennsylvania Act 2 Statewide Health Standard, Residential, Used Aquifer, TDS ≤ 2500 Medium Specific Concentrations (MSCs) criteria. The laboratory analytical reports are presented in Attachment 3.

Benzene was the only volatile organic compound detected at concentrations over the aforementioned MSCs criteria. Benzene exceeded the MSC criteria in five wells sampled (MW-159, MW-160, MW-162, MW-163S, and MW-501S), ranging in concentration from 790 µg/L in MW-160 to 79,000 µg/L in MW-162.

Eighteen dissolved metals (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, selenium, sodium, vanadium, and zinc) were detected at concentrations above the laboratory detection limits; however, only nine metals (arsenic, beryllium, cadmium, chromium, cobalt, manganese, nickel, vanadium, and zinc) were detected at concentrations greater than the MSCs criteria.

Purge water was containerized in 55-gallon drums and was disposed of at an appropriate facility, in accordance with regulations.

In summary, the groundwater results are generally consistent with those determined in recent sample events conducted in 2015 and 2016 and historical results determined in the 1990's. Over this period variations have occurred, but the recent results are similar to historical detections.

CONCLUSION

Tetra Tech is pleased to have the opportunity to continue to serve the Trust, the PADEP, and the USEPA on this project. Tetra Tech looks forward to discussing the fourth quarter sampling results with the PADEP and USEPA. Please contact me at (412) 921-8398 or at Keith.Henn@tetratech.com if you have any questions.

Sincerely,

Keith Henn, PG
Senior Project Manager



Attachments:

Tables 1 through 3

Figures 1 through 3

Attachments 1 through 3

cc: Lyondell Environmental Custodial Trust (w/attachments)
Oscar Vazquez-Martinez, PADEP (w/attachments)
Michael Kovacich, Tetra Tech, Inc. (w/attachments)
Jonathan Aglio, Tetra Tech, Inc. (w/attachments)
Derek Amidon, Tetra Tech, Inc. (w/attachments)

TABLES

Table 1
Groundwater Gauging Data
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

Location	Top of PVC/Pipe Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater/Surface Water Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater/Surface Water Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater/Surface Water Elevation ⁽¹⁾	
9-Nov-15					20-Jun-16					15-Aug-16				
MW-120	708.34	NM	25.80	682.54	0.00	25.48	682.86	0.00	26.12	682.22	0.00	26.19	682.15	
MW-159	706.92	NM	24.45	682.47	0.00	25.24	681.68	0.00	25.81	681.11	0.00	25.53	681.39	
MW-160	697.17	NM	17.29	679.88	0.00	17.09	680.08	0.00	17.52	679.65	0.00	17.41	679.76	
MW-161	700.71	19.25	19.26	681.45	19.07	19.08	681.63	19.40	19.41	681.30	19.25	19.26	681.45	
MW-162	702.08	NM	22.44	679.64	0.00	22.07	680.01	0.00	22.63	679.45	0.00	22.66	679.42	
MW-163S	687.49	NM	7.42	680.07	0.00	7.25	680.24	0.00	7.57	679.92	0.00	7.51	679.98	
MW-501S	698.66	NM	17.78	680.88	0.03	17.46	681.20	0.03	17.93	680.73	0.00	17.76	680.90	
MW-501D	698.66	NM	48.10	650.56	0.00	47.89	650.77	0.00	48.06	650.60	0.00	47.96	650.70	
SG-1	683.73	NA	NA	NA	NA	1.15	682.58	NA	1.48	682.25	NA	1.49	682.24	

Notes:

1 - Feet Above Mean Sea Level

2 - Light Non-Aqueous Phase Liquid

3- Measured Depth Below Top of Casing

NA = Not Applicable

NM = No Measurable LNAPL

Table 2
Groundwater Chemistry Field Measurements
November 2016 Sampling Event
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

Well ID	Date	Temperature (°C) ⁽¹⁾	pH (SU) ⁽²⁾	Specific Conductivity (mS/cm) ⁽³⁾	Turbidity (NTUs) ⁽⁴⁾	ORP (mvolts) ⁽⁵⁾	DO (mg/L) ⁽⁶⁾
MW-120	11/22/16	9.61	6.93	0.93	2.05	-104.3	0.24
MW-159	11/21/16	9.60	6.55	0.89	4.07	-6.1	0.83
MW-160	11/21/16	10.4	6.88	1.10	2.83	-38.3	0.11
MW-162	11/22/16	9.33	6.67	1.37	3.15	-58.5	0.11
MW-163S	11/21/16	11.75	4.94	1.89	9.00	45.1	0.25
MW-501S	11/21/16	9.58	3.26	8.63	1.11	190.3	0.19

Notes:

Field parameters measured at the conclusion of purging with a Horiba water quality instrument.

⁽¹⁾ °C = degrees celcius

⁽²⁾ SU = Standard Unit

⁽³⁾ mS/cm = millisiemens/centimeter

⁽⁴⁾ NTUs = Nephelometric Turbidity Units

⁽⁵⁾ mvolts = millivolts

⁽⁶⁾ mg/l = milligrams/liter

Table 3
Groundwater Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION:	PADEP Residential Used Aquifer MSC ⁽¹⁾	MW120	MW120	MW120	MW-120	MW-120	MW-120	MW159	MW-159	MW-159	MW-159	MW160	MW-160	MW-160	MW-160
SAMPLE ID:		MW120	MW120-AVG	MW120-D	MW-120	MW-120	MW-120	MW159	MW-159	MW-159	MW-159	MW160	MW-160	MW-160	MW-160
SAMPLE DATE:		20151109	20151109	20151109	20160620	20160816	20161122	20151110	20160621	20160815	20161121	20151111	20160620	20160815	20161121
SAMPLE CODE:		ORIG	AVG	DUP	ORIG										
MATRIX:		GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
SEMOVOLATILES (UG/L)															
1,1-BIPHENYL	1800	8.1 U	8.2 U	8.3 U	NA	NA	NA	13	NA	NA	NA	2 J	NA	NA	NA
2,4-DIMETHYLPHENOL	730	3.3 J	3.45	3.6 J	NA	NA	NA	2.4 J	NA	NA	NA	4.5 J	NA	NA	NA
2-METHYLNAPHTHALENE	150	1.6 U	1.65 U	1.7 U	NA	NA	NA	1.2 J	NA	NA	NA	1.7 U	NA	NA	NA
3&4-METHYLPHENOL	NC	3.1 J	3.2	3.3 J	NA	NA	NA	2.7 J	NA	NA	NA	2.6 J	NA	NA	NA
ACETOPHENONE	3700	16	16	16 J	NA	NA	NA	14 J	NA	NA	NA	19	NA	NA	NA
BENZALDEHYDE	NC	16 U	16.5 U	17 U	NA	NA	NA	3.2 J	NA	NA	NA	17 U	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	6	16 U	16.5 U	17 U	NA	NA	NA	16 U	NA	NA	NA	13 J	NA	NA	NA
DIETHYL PHTHALATE	29000	3.2 J	3.2 J	8.3 U	NA	NA	NA	7.6 J	NA	NA	NA	3 J	NA	NA	NA
FLUORENE	1500	1.6 U	1.65 U	1.7 U	NA	NA	NA	3.1	NA	NA	NA	0.66 J	NA	NA	NA
NAPHTHALENE	100	0.98 J	0.925	0.87 J	NA	NA	NA	26	NA	NA	NA	1.7 U	NA	NA	NA
PHENANTHRENE	1100	1.6 U	1.65 U	1.7 U	NA	NA	NA	5.1	NA	NA	NA	1.7 U	NA	NA	NA
PHENOL	2000	22	21	20	NA	NA	NA	13	NA	NA	NA	3.6 J	NA	NA	NA
VOLATILES (UG/L)															
BENZENE	5	4100	4000	3900	5 U	5 U	5 U	25000	53000	41000	36000	770	5 U	2600	790
ETHYLBENZENE	700	500 U	500 U	500 U	5 U	5 U	5 U	500 U	5000 U	2500 U	7500 U	100 U	5 U	250 U	250 U
TOLUENE	1000	500 U	500 U	500 U	5 U	5 U	5 U	500 U	5000 U	2500 U	7500 U	100 U	5 U	250 U	250 U
TOTAL XYLEMES	10000	1000 U	1000 U	1000 U	10 U	10 U	10 U	1000 U	10000 U	5000 U	15000 U	200 U	10 U	500 U	500 U

(1) Pennsylvania Act 2 Department of Environmental Protection's Statewide Health Standard, Residential, Used Aquifer, TDS ≤ 2500 Medium -Specific Concentration (MSC)

4100 =Exceeds MSC

ug/L = micrograms per liter

U = Below Reporting Limit

B = Detected in Method Blank

J = Estimated Result

F1 = Matrix spike recovery noncompliance

GW = Groundwater

ORIG = Original or Parent Sample

AVG = Average of Original and Duplicate Sample

DUP = Duplicate Sample

NA = Not Analyzed

NC = No Criteria

Table 3
Groundwater Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION:	PADEP Residential Used Aquifer MSC ⁽¹⁾	MW162	MW-162	MW-162	MW-162	MW163S	MW-163S	MW-163S	MW-163S	MW501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	
SAMPLE ID:		MW162	MW-162	MW-162	MW-162	MW163S	MW-163S	MW-163S	MW-163S	MW501S	MW-501S	MW-501S-D	MW-501S	MW-501S-AVG	MW-501S	MW-501S-D	MW-501S	MW-501S-AVG	MW-501S-D
SAMPLE DATE:		20151109	20160620	20160816	20161122	20151110	20160621	20160815	20161121	20151111	20160621	20160621	20160816	20160816	20160816	20161121	20161121	20161121	
SAMPLE CODE:		ORIG	DUP	ORIG	AVG	DUP	ORIG	AVG	DUP-01										
MATRIX:		GW	GW	GW	GW	GW	GW	GW											
SEMIVOLATILES (UG/L)																			
1,1-BIPHENYL	1800	7.6 U	NA	NA	NA	8.9 U	NA	NA	NA	1.3 J	NA	NA	NA	NA	NA	NA	NA	NA	
2,4-DIMETHYLPHENOL	730	2.9 J	NA	NA	NA	8.9 U	NA	NA	NA	5.2 J	NA	NA	NA	NA	NA	NA	NA	NA	
2-METHYLNAPHTHALENE	150	1.5 U	NA	NA	NA	1.8 U	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	
3&4-METHYLPHENOL	NC	7.6 U	NA	NA	NA	8.9 U	NA	NA	NA	8.9 U	NA	NA	NA	NA	NA	NA	NA	NA	
ACETOPHENONE	3700	9.5 J	NA	NA	NA	1.8 J	NA	NA	NA	610	NA	NA	NA	NA	NA	NA	NA	NA	
BENZALDEHYDE	NC	15 U	NA	NA	NA	18 U	NA	NA	NA	18 U	NA	NA	NA	NA	NA	NA	NA	NA	
BIS(2-ETHYLHEXYL)PHTHALATE	6	15 U	NA	NA	NA	18 U	NA	NA	NA	6.1 J	NA	NA	NA	NA	NA	NA	NA	NA	
DIETHYL PHTHALATE	29000	4.5 J	NA	NA	NA	8.9 U	NA	NA	NA	4 J	NA	NA	NA	NA	NA	NA	NA	NA	
FLUORENE	1500	1.5 U	NA	NA	NA	1.8 U	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	
NAPHTHALENE	100	3.7	NA	NA	NA	2.4	NA	NA	NA	20	NA	NA	NA	NA	NA	NA	NA	NA	
PHENANTHRENE	1100	1.5 U	NA	NA	NA	1.8 U	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	
PHENOL	2000	150 F1	NA	NA	NA	8.9 U	NA	NA	NA	100	NA	NA	NA	NA	NA	NA	NA	NA	
VOLATILES (UG/L)																			
BENZENE	5	16000	100 F1	29000	79000	3000	5300	2000	4800	95000	66000	69000	72000	55000	55500	56000	7800	9900	12000
ETHYLBENZENE	700	100 J	5 U	2500 U	2500 U	500 U	500 U	5 U	1500 U	420 J	5000 U	5000 U	5000 U	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U
TOLUENE	1000	170 J	5 U	2500 U	2500 U	500 U	500 U	5 U	1500 U	1300	5000 U	5000 U	5000 U	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U
TOTAL XYLEMES	10000	1000 U	10 U	5000 U	5000 U	1000 U	1000 U	10 U	3000 U	590 J	10000 U	10000 U	10000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U

(1) Pennsylvania Act 2 Department of Environmental Protection

4100 =Exceeds MSC

ug/l = micrograms per liter

U = Below Reporting Limit

B = Detected in Method Blank

J = Estimated Result

F1 = Matrix spike recovery noncompliance

GW = Groundwater

ORIG = Original or Parent Sample

AVG = Average of Original and Duplicate Sample

DUP = Duplicate Sample

NA = Not Analyzed

NC = No Criteria

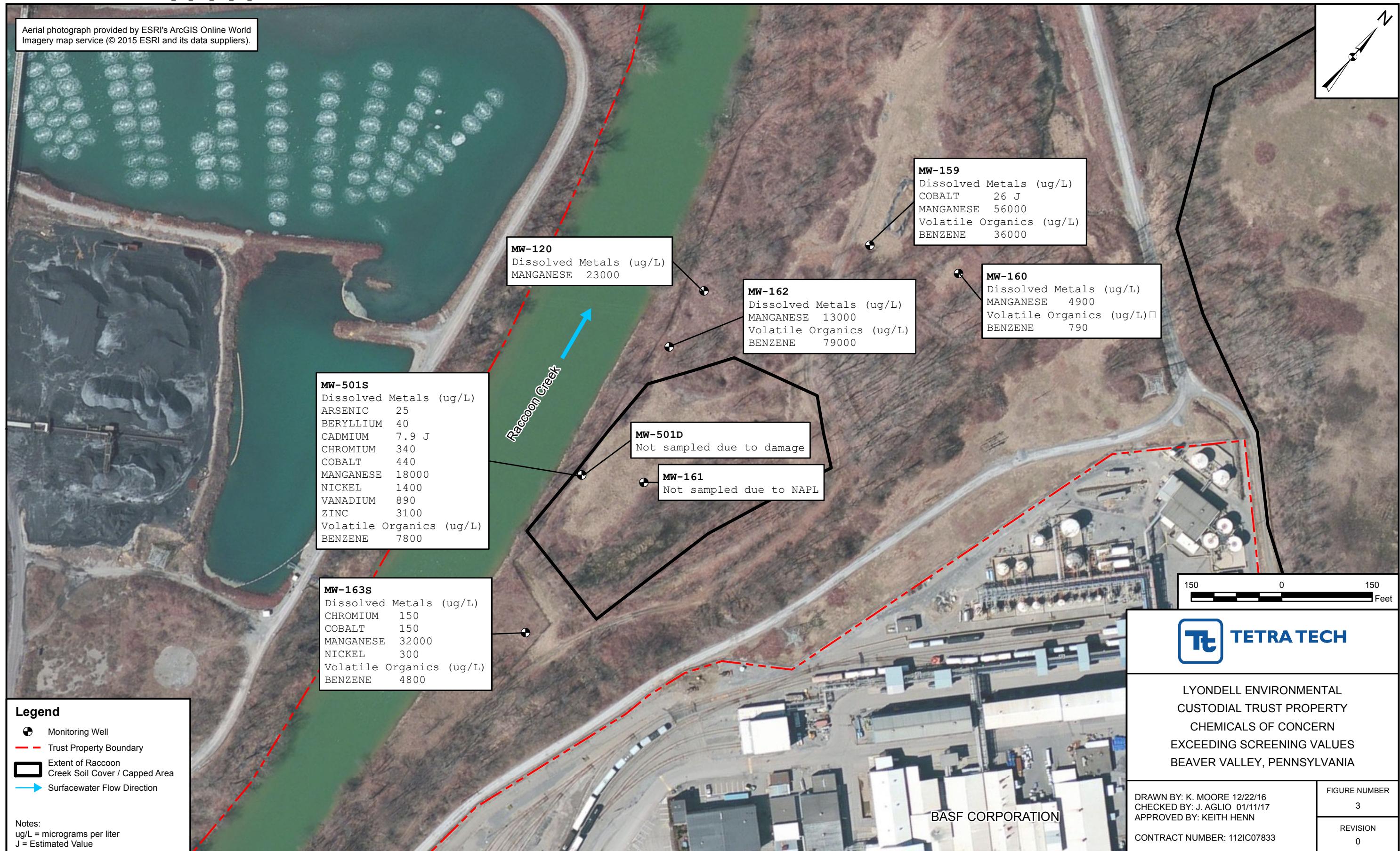


TETRA TECH

FIGURES







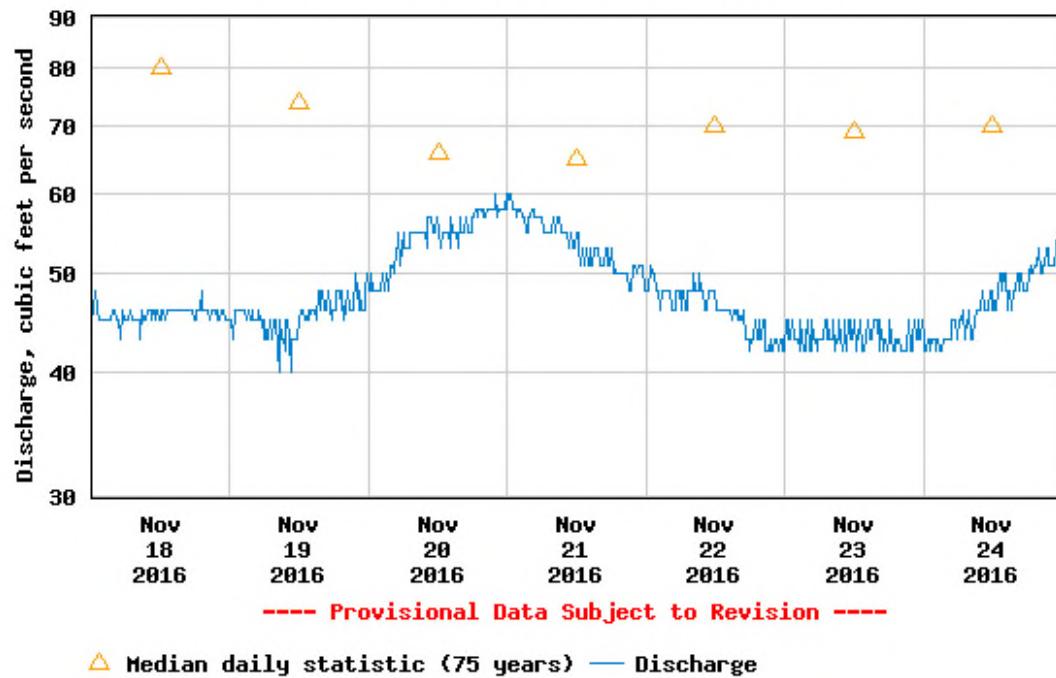


TETRA TECH

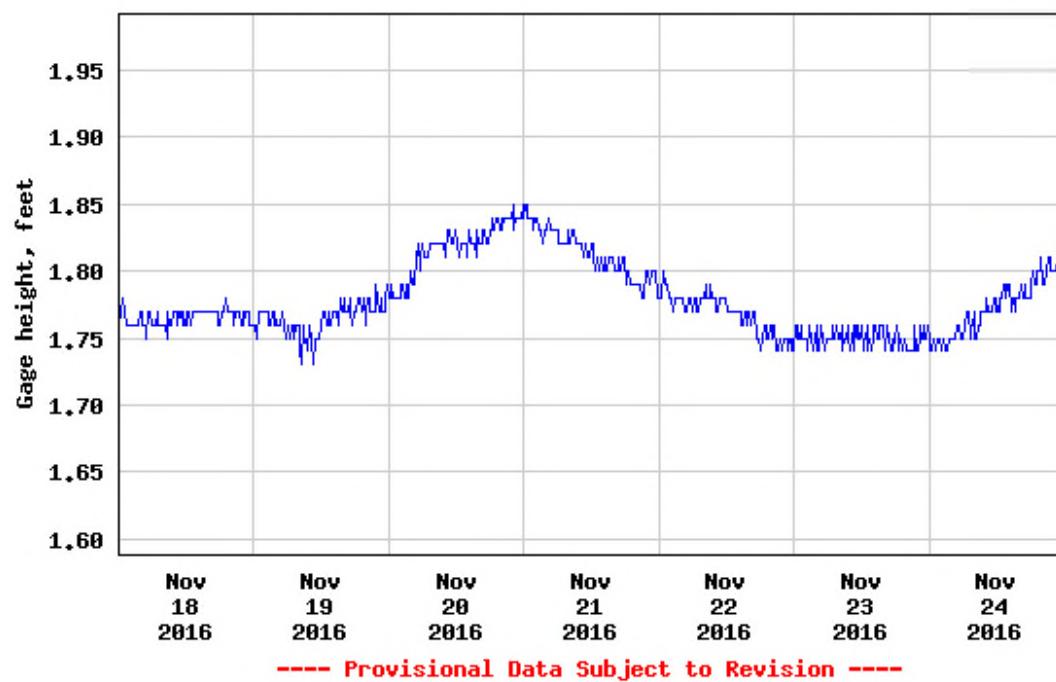
**ATTACHMENT 1
USGS STAFF GAUGE SUMMARY**



USGS 03108000 Raccoon Creek at Moffatts Mill, PA

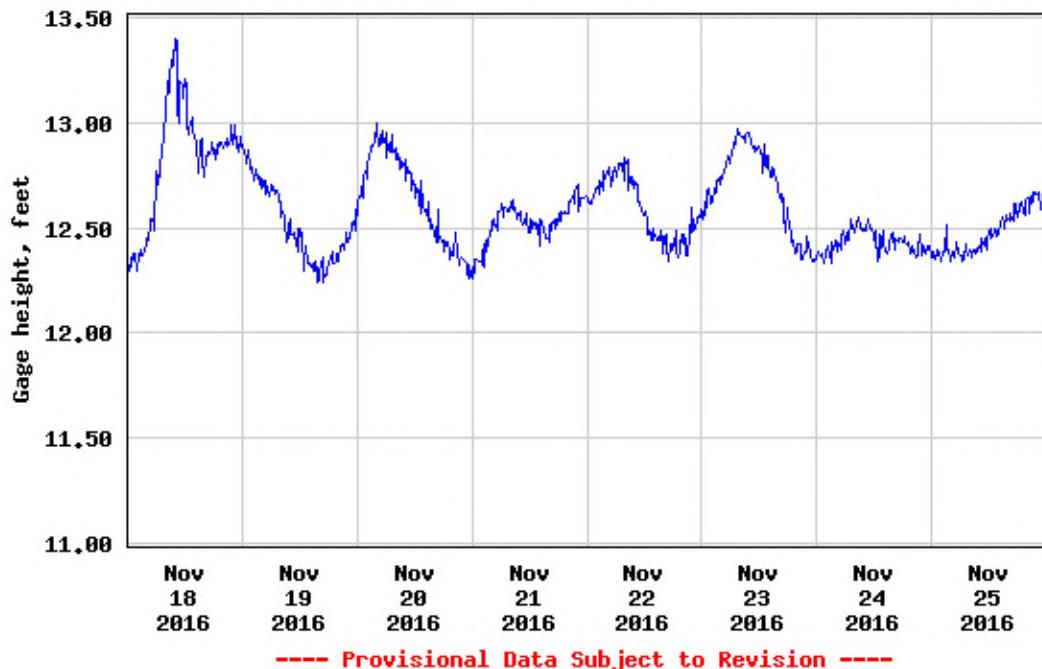


USGS 03108000 Raccoon Creek at Moffatts Mill, PA

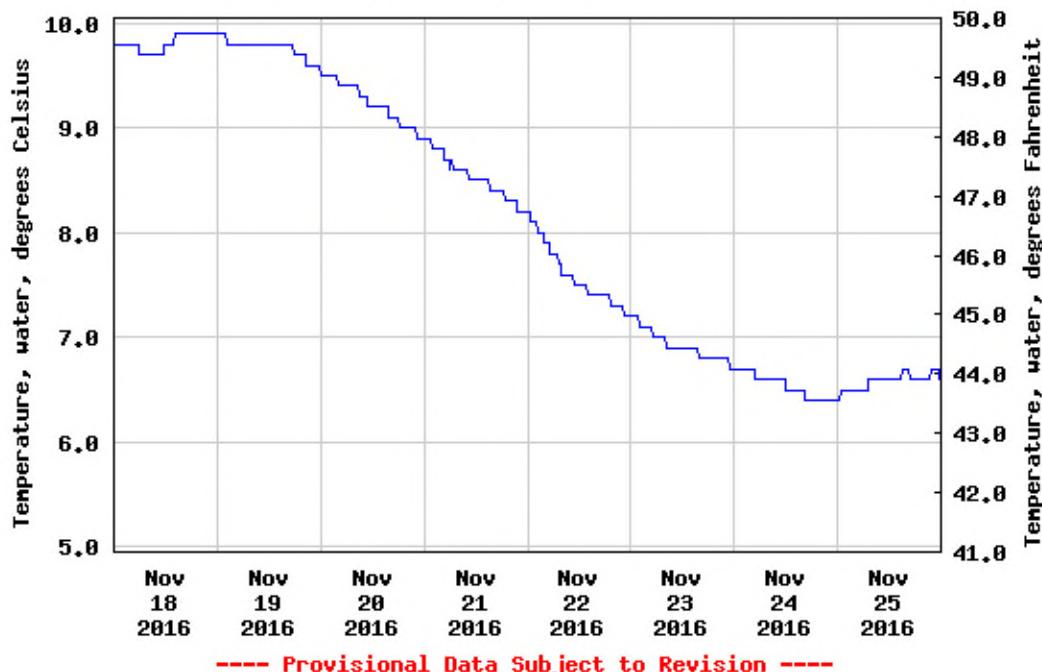




USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohiovie, PA

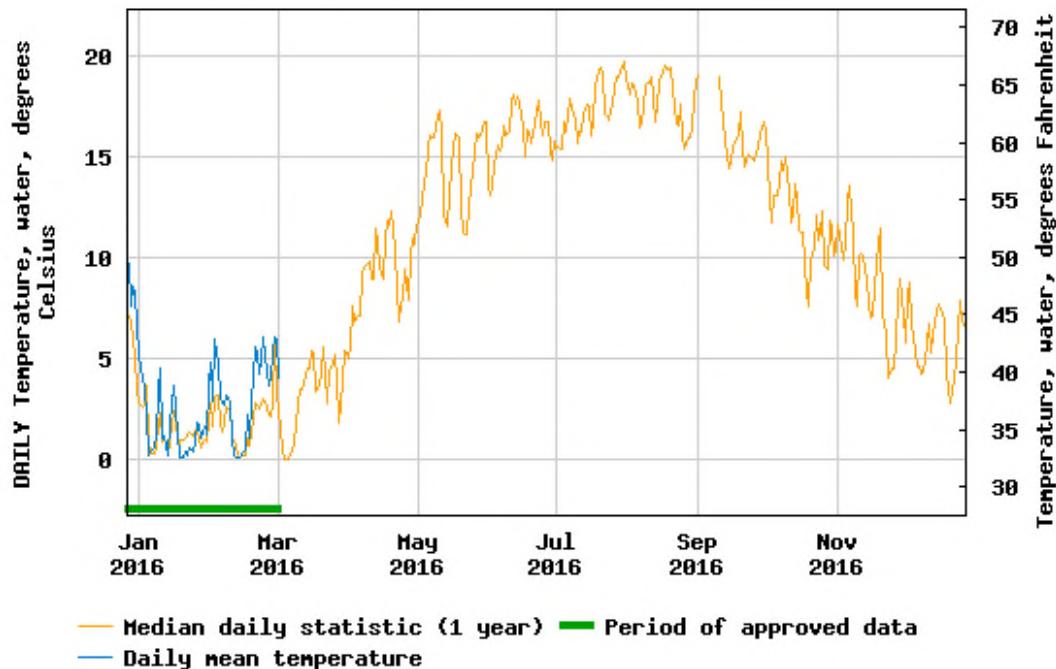


USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohiovie, PA

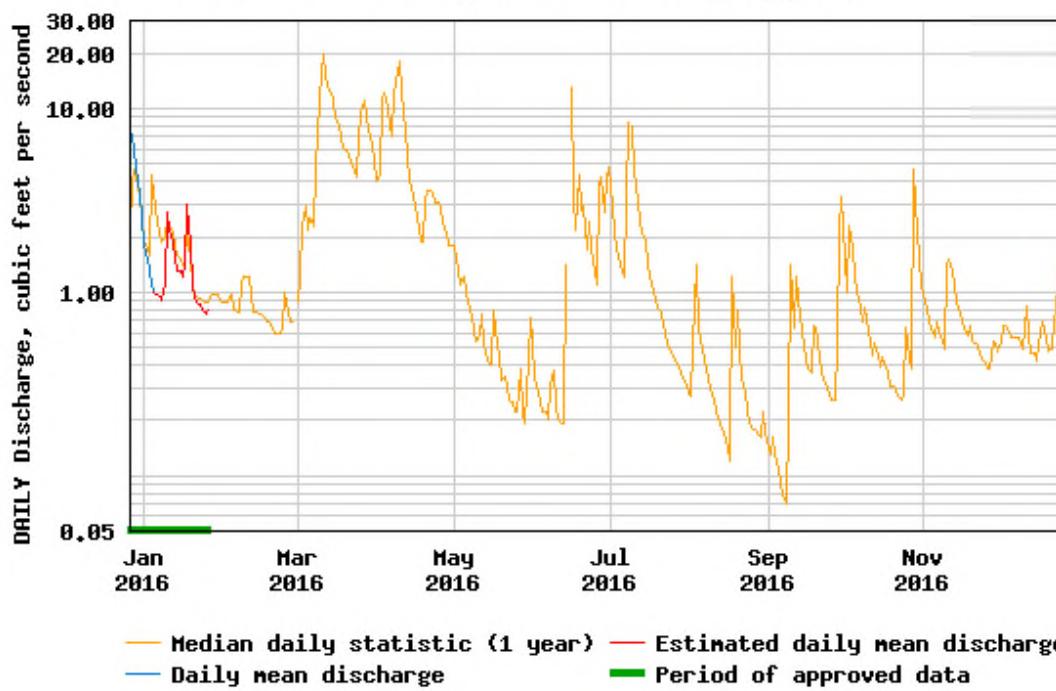




USGS 03108010 Fishpot Run near Shippingport, PA



USGS 03108010 Fishpot Run near Shippingport, PA





TETRA TECH

**ATTACHMENT 2
FIELD DATA SHEETS**

GROUNDWATER SAMPLE LOG SHEET


Tetra Tech Inc.

Event: _____
 Project Site Name: _____
 Project No.: _____

Sample ID:	MW-120	Sampled By:	M. Simcik + T. Aguirre
QA/QC Duplicate ID:	NO	Sample Date:	11-22-16
MS/MSD Collected:	YES (NO)	Sample Time:	0905

WELL INFORMATION:	
Well ID :	MW-120
Well Diameter (in):	4"
Top of Screen (ft-BTOR):	
Bottom of Screen (ft-BTOR):	
Total Well Depth (ft-BTOR):	
Purge Date:	11-22-16
Static Water Level (ft-BTOR):	35.19
PID Monitor Reading:	-
Purge Method:	Low Flow Bladder
Sample Method:	Low Flow

EQUIPMENT INFORMATION:	
Water Quality Instrument:	YSI (4534 90.)
Turbidity Meter:	La Motte 2020 rev 1162-2911

Time (Hrs)	H ₂ O Level (ft-BTOR)	Flow mL/min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
0820	26.04	250	Yellowish	6.76	0.830	1.24	4.26	6.77	-64.3	-	Slight odor
0925	26.13	"	"	6.80	0.858	1.01	3.16	7.71	-72.5	-	
0930	26.26	"	"	6.82	0.876	0.91	2.47	8.21	-81.6	-	
0935	26.36	"	"	6.97	0.8915	0.65	2.36	8.90	-94.6	-	
0940	26.50	"	"	6.99	0.969	0.63	2.37	8.24	-97.8	-	
0945	26.61	"	"	6.89	0.913	0.51	2.72	9.56	-103.0	-	
0950	26.71	"	"	6.40	0.911	0.39	2.21	9.61	-107.8	-	
0955	27.13	"	"	6.91	0.914	0.37	2.16	9.60	-106.1	-	
0900	27.33	"	"	6.93	0.920	0.23	1.91	9.55	-102.1	-	
0905	27.75	"	"	6.93	0.931	0.34	2.05	9.61	-104.3	-	✓

Start Purge	End Purge	Total (min.)	Total Vol. (gal./L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
0820	0905	45		6.93	0.931	0.24	2.05	9.61	-104.3	✓	Slight odor

ANALYSIS, PRESERVATION AND BOTTLE REQUIREMENTS											
Analysis	Method			Preservative	Number	Vol.	Bottle Type	Collected			
BTEX				4% HCl	3	40mL	9/16.55				✓
D.C Metals				HNO ₃	1	250mL	Plastic				✓

Observations / Notes:				
Coordinates:	N	E	Signature(s):	/

GROUNDWATER SAMPLE LOG SHEET



Tetra Tech Inc.

Event: _____
 Project Site Name: _____
 Project No.: _____

Sample ID:	MW_160										Sampled By:	M. Simcik / J. Aguirre							
QA/QC Duplicate ID:	NO										Sample Date:	11-21-16							
MS/MSD Collected:	YES	NO											Sample Time:	1400					
WELL INFORMATION:																			
Well ID :	MW - 160													Purge Date:	11-21-16				
Well Diameter (in):	4													Static Water Level (ft-BTOR):					
Top of Screen (ft-BTOR):																	PID Monitor Reading:		
Bottom of Screen (ft-BTOR):																	Purge Method:	Low Flow	
Total Well Depth (ft-BTOR):																	Sample Method:	Low Flow	
EQUIPMENT INFORMATION:																			
Water Quality Instrument:	YSI (4534 90s)													Pump Controller:	QCN				
Turbidity Meter:	La Motte 2020 w/e 1162-2911																		
PURGE DATA:																			
Time (Hrs)	H ² O Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other								
1315	17.43	250	Clear	7.03	1,096	0.10	10.2	10.10	-8.8	—	odor								
1322	17.43	250	Clear	6.94	1,156	0.10	10.9	10.37	-16.5	—	odor								
1325	17.43	250	"	6.95	1.159	0.54	3.35	10.30	-23.7	—	odor								
1330	17.43	250	"	6.94	1.153	0.33	3.73	10.31	-26.7	—	odor								
1335	17.43	"	"	6.93	1.141	0.27	4.21	10.28	-27.4	—	odor								
1340	17.43	"	"	6.92	1.139	0.21	3.76	10.42	-29.0	—	"								
1345	17.43	"	"	6.89	1.116	0.17	3.45	10.45	-35.3	—	"								
1350	17.43	"	"	6.88	1.101	0.15	2.99	10.50	-36.1	—	"								
1355	17.43	"	"	6.88	1.099	0.14	4.53	10.48	-38.1	—	"								
1400	17.43	"	"	6.88	1.098	0.11	2.83	10.40	-38.3	—	"								
FINAL PURGE / SAMPLE DATA:																			
Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other								
1315	1400	45	6.88	1.098	0.11	2.83	10.40	-38.3	—	odor									
ANALYSIS, PRESERVATION AND BOTTLE REQUIREMENTS																			
Analysis	Method			Preservative		Number	Vol.	Bottle Type		Collected									
BTEX	8260C			HCl		3	40ml	various											
715 Metals				HNO ₃		1	250ml	250ml Plastic											
OBSERVATIONS / NOTES:																			

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET



Tetra Tech Inc.

Event: _____
 Project Site Name: _____
 Project No.: _____

Sample ID: MW-162	Sampled By: M. Smrk / J. Aglio										
QA/QC Duplicate ID: NO	Sample Date: 11-22-16										
MS/MSD Collected: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Sample Time: 1015										
WELL INFORMATION:											
Well ID : MW-162	Purge Date: 11-22-16										
Well Diameter (in): 4	Static Water Level (ft-BTOR): 22.57										
Top of Screen (ft-BTOR):	PID Monitor Reading:										
Bottom of Screen (ft-BTOR):	Purge Method: Low Flow Bladder										
Total Well Depth (ft-BTOR):	Sample Method: Low Flow Bladder										
EQUIPMENT INFORMATION:											
Water Quality Instrument: YSI 4534 90x	Pump Controller: AED										
Turbidity Meter: LaMotte 2020 NC H2923 1162-2911											
PURGE DATA:											
Time (Hrs)	H ₂ O Level (ft-BTOR)	Flow mL/min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
0930	22.63	300	Clear	6.73	1.247	0.45	7.69	9.78	-36.7	-	Slight odor
0935	22.59	"	"	6.74	1.285	0.34	5.47	8.96	-46.8	-	
0940	22.59	"	"	6.73	1.316	0.20	4.62	9.09	-54.9	-	
0945	22.59	"	"	6.72	1.328	0.19	4.22	9.10	-59.6	-	
0950	22.59	"	"	6.71	1.339	0.18	4.19	9.11	-61.3	-	
0955	22.59	"	"	6.70	1.344	0.17	3.74	9.14	-59.2	-	
1000	22.59	"	"	6.69	1.352	0.13	3.80	9.22	-59.4	-	
1005	22.59	"	"	6.68	1.358	0.13	4.17	9.23	-56.5	-	
1010	22.59	"	"	6.68	1.364	0.12	3.25	9.28	-59.4	-	
1015	22.59	"	"	6.67	1.367	0.11	3.15	9.33	-58.5	-	

Start Purge	End Purge	Total (min.)	Total Vol. (gal./L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
0930	1015	45		6.67	1.367	0.11	3.15	9.33	-58.5	-	Slight odor

ANALYSIS, PRESERVATION AND BOTTLE REQUIREMENTS											
Analysis	Method			Preservative		Number	Vol.	Bottle Type		Collected	
BTEX				HCl		3	40ml	91655			
D.S. Meth				HNO ₃		1	250ml	Plastic			

OBSERVATIONS / NOTES:												
Coordinates:	N		E		Signature(s): <i>M. Smrk / J. Aglio</i>							

GROUNDWATER SAMPLE LOG SHEET



Tetra Tech Inc.

FB-01 Collected 1035

Event: _____
 Project Site Name: _____
 Project No.: _____

Sample ID: MW-1635	Sampled By: M. Simcock / T. Ashby
QA/QC Duplicate ID: NO	Sample Date: 11-21-16
MS/MSD Collected: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Sample Time: 1115
WELL INFORMATION:	
Well ID : MW-1635	Purge Date: 11-21-16
Well Diameter (in): 4	Static Water Level (ft-BTDR): 7.15
Top of Screen (ft-BTDR):	PID Monitor Reading: ✓
Bottom of Screen (ft-BTDR):	Purge Method: Perry Pump Bladder Pump
Total Well Depth (ft-BTDR):	Sample Method: Perry Pump Bladder Pump
EQUIPMENT INFORMATION:	
Water Quality Instrument: VSI (45384 90%)	Pump Controller: N/A Perry Pump Q20
Turbidity Meter: La Motte 2000 1162-0911	

Time (Hrs)	H ² O Level (ft-BTDR)	Flow mL/min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1030	7.61	350	Clear	4.75	1.950	1.98	30.0	11.48	89.1	—	Slight odor
1035	7.63	11	"	4.84	1.957	0.32	29.1	11.69	62.1	—	
1040	7.63	11	"	4.96	1.949	0.22	23.8	11.81	55.9	—	
1050	7.63	11	"	4.88	1.931	0.16	18.5	11.85	50.9	—	
1055	7.63	11	"	4.89	1.922	0.29	14.6	11.84	47.8	—	
1100	7.62	11	"	4.90	1.910	0.34	12.6	11.65	46.4	—	
1105	7.62	11	"	4.91	1.896	0.28	10.40	11.68	45.5	—	
1110	7.62	11	"	4.93	1.889	0.31	12.00	11.72	45.7	—	
1115	7.62	11	"	4.94	1.886	0.25	9.00	11.75	45.1	—	↓

Start Purge	End Purge	Total (min.)	Total Vol. (gal./L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1030	1145	45		4.94	1.886	0.25	9.00	11.75	45.1	—	Slight odor

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
BTEX	8260	HCl	3	40 mL	Vinyls	✓
D.S. Metals		HNO ₃	1	250 mL	Plastic	✓

Coordinates:	N	E	Signature(s): 

GROUNDWATER SAMPLE LOG SHEET



Tetra Tech Inc.

Event: _____
 Project Site Name: _____
 Project No.: _____

soj

Sample ID: MW - 1055	Sampled By: M. Smirk + J. Aglio
QA/QC Duplicate ID: 455 Dup-01	Sample Date: 11/21/16
MS/MSD Collected: YES NO	Sample Time: 1000

WELL INFORMATION:

Well ID : MW - 1055	Purge Date: 11/21/16
Well Diameter (in): 2	Static Water Level (ft-BTOR):
Top of Screen (ft-BTOR):	PID Monitor Reading: —
Bottom of Screen (ft-BTOR):	Purge Method: Ferry Pump Low Flow
Total Well Depth (ft-BTOR):	Sample Method: Ferry Pump

EQUIPMENT INFORMATION:

Water Quality Instrument: YSI (4534 90A)	Pump Controller: Ferry Pump
Turbidity Meter: LaMotte 2020 we 1163-2911	

PURGE DATA:

Time (Hrs)	H ₂ O Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
0915	19.38	300	clear/yellow	3.38	8.172	1.68	2.41	9.55	126.0	—	odor
0925	19.08	250	"	3.28	8.620	0.46	1.41	9.53	144.3	—	odor
0930	18.97	"	"	3.27	8.653	0.30	2.42	9.53	158.0	—	odor
0935	18.98	"	"	3.26	8.640	0.25	5.78	9.58	166.0	—	odor
0940	19.01	"	"	3.26	8.082	0.20	2.33	9.55	174.4	—	odor
0945	19.04	"	"	3.26	8.099	0.18	2.36	9.57	178.3	—	odor
0950	19.06	"	"	3.26	8.636	0.16	1.56	9.61	183.5	—	odor
0955	19.09	"	"	3.26	8.640	0.17	1.06	9.59	191.0	—	odor
1000	19.07	"	"	3.26	8.638	0.19	1.11	9.58	190.3	—	odor

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
0915	1000	45		3.26	8.638	0.19	1.11	9.58	190.3	—	odor

ANALYSIS, PRESERVATION AND BOTTLE REQUIREMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
BTEX	8260C	HCl	3	40ml	Vials	✓
Dis. Melts		HNO ₃	1	250ml	Plastic	✓

OBSERVATIONS / NOTES:

(A 0.90 flow rate lowered to 0.56 mL/min to cover drawdown

Coordinates:	N	E	Signature(s):
			/



TETRA TECH

**ATTACHMENT 3
TESTAMERICA ANALYTICAL REPORT**

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-61091-1

Client Project/Site: Lyondell Beaver Valley Plant Groundwater

For:

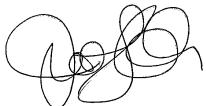
Tetra Tech, Inc.

Foster Plaza 7

661 Anderson Drive

Pittsburgh, Pennsylvania 15220-2745

Attn: Mr. Jonathon Aglio



Authorized for release by:

11/30/2016 5:43:51 PM

Jill Colussy, Project Manager I

(412)963-2444

jill.colussy@testamericainc.com

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Job ID: 180-61091-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative 180-61091-1

Receipt

The samples were received on 11/22/2016 12:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5° C.

The chain of custody did not list a sampling time for TB-01. The time was logged in as 12:00.

As per the client the identification of sample MW-105S was changed to MW-501S. The e-mail from the client is included in the report.

GC/MS VOA

The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-162 (180-61091-1), MW-160 (180-61091-3), MW-159 (180-61091-4), MW-163S (180-61091-7), MW-501S (180-61091-8) and DUP-01 (180-61091-9). Elevated reporting limits (RLs) are provided.

Method(s) 8260C: Due to the high concentration of Benzene, the matrix spike / matrix spike duplicate (MS/MSD) for analytical batch 180-195597 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Metals

The following sample was diluted to bring the concentration of manganese within the linear range of the instrument: MW-120 (180-61091-2). Elevated reporting limits (RLs) are provided. Silver, selenium, and thallium were also reported from dilution due to inter-element corrections associated with manganese.

The following samples were diluted to bring the concentration of manganese within the linear range of the instrument: MW-159 (180-61091-4), and MW-163S (180-61091-7). Elevated reporting limits (RLs) are provided. Silver, selenium, and thallium were also reported from dilution due to inter-element corrections associated with manganese. Arsenic was also reported from dilution due to the concentration being less than the negative reporting limit.

Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following samples: MW-501S (180-61091-8) and DUP-01 (180-61091-9). All analytes referencing the yttrium internal standards required dilution due to the yttrium counts being high and outside the 70%-130% control limits.

The following sample was diluted to bring the concentration of iron within the linear range of the instrument: MW-501S (180-61091-8) and DUP-01 (180-61091-9). Elevated reporting limits (RLs) are provided. Nickel, lead, antimony, and vanadium, were also reported from dilution due to inter-element corrections associated with iron.

Colussy, Jill

From: Aglio, Jon <Jon.Aglio@tetrtech.com>
Sent: Tuesday, November 29, 2016 6:55 AM
To: Colussy, Jill
Subject: RE: TestAmerica sample confirmation files from 180-61081-1 Lyondell Beaver Valley Plant Groundwater

Jill,

There was an error on the chain of custody. MW-105S should be MW-501S.

Please make the correction.

Thanks,

Jon

From: Colussy, Jill [mailto:jill.colussy@testamericainc.com]
Sent: Monday, November 28, 2016 8:35 AM
To: Aglio, Jon <Jon.Aglio@tetrtech.com>
Subject: TestAmerica sample confirmation files from 180-61081-1 Lyondell Beaver Valley Plant Groundwater

Jon,

Attached please find the sample confirmation files for job 180-61081-1; Lyondell Beaver Valley Plant Groundwater

Jill

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: [Project Feedback](#)

JILL L COLUSSY
Project Manager I

TestAmerica Pittsburgh
THE LEADER IN ENVIRONMENTAL TESTING

Tel: 412.963.2444
www.testamericainc.com

Reference: [170630]
Attachments: 3

Definitions/Glossary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.
F1	MS and/or MSD Recovery is outside acceptance limits.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Pennsylvania	NELAP	3	02-00416	04-30-17

1

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Sample Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-61091-1	MW-162	Water	11/22/16 10:15	11/22/16 12:10
180-61091-2	MW-120	Water	11/22/16 09:05	11/22/16 12:10
180-61091-3	MW-160	Water	11/21/16 14:00	11/22/16 12:10
180-61091-4	MW-159	Water	11/21/16 12:45	11/22/16 12:10
180-61091-5	FB-01	Water	11/21/16 10:35	11/22/16 12:10
180-61091-6	TB-01	Water	11/21/16 00:00	11/22/16 12:10
180-61091-7	MW-163S	Water	11/21/16 11:15	11/22/16 12:10
180-61091-8	MW-501S	Water	11/21/16 10:00	11/22/16 12:10
180-61091-9	DUP-01	Water	11/21/16 00:00	11/22/16 12:10

TestAmerica Pittsburgh

Method Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL PIT
6010C	Metals (ICP)	SW846	TAL PIT
7470A	Mercury (CVAA)	SW846	TAL PIT

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Client Sample ID: DUP-01

Date Collected: 11/21/16 00:00

Date Received: 11/22/16 12:10

Lab Sample ID: 180-61091-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010C Instrument ID: C		5			195771	11/29/16 15:08	RJG	TAL PIT
Dissolved	Prep	7470A			50 mL	50 mL	195448	11/25/16 13:21	ANA	TAL PIT
Dissolved	Analysis	7470A Instrument ID: K		1			195820	11/30/16 07:20	ANA	TAL PIT

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

ANA = Alexis Anderson

RJR = Ron Rosenbaum

Batch Type: Analysis

ANA = Alexis Anderson

PJJ = Patrick Journet

RJG = Rob Good

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Client Sample ID: TB-01

Date Collected: 11/21/16 00:00

Date Received: 11/22/16 12:10

Lab Sample ID: 180-61091-6

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			11/28/16 12:30	1
o-Xylene	ND		5.0	2.9	ug/L			11/28/16 12:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	78		62 - 123					11/28/16 12:30	1
4-Bromofluorobenzene (Surr)	86		75 - 120					11/28/16 12:30	1
Dibromofluoromethane (Surr)	91		80 - 120					11/28/16 12:30	1
Toluene-d8 (Surr)	105		80 - 120					11/28/16 12:30	1

Client Sample ID: MW-163S

Date Collected: 11/21/16 11:15

Date Received: 11/22/16 12:10

Lab Sample ID: 180-61091-7

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	4800		1500	910	ug/L			11/28/16 19:37	300
Toluene	ND		1500	1100	ug/L			11/28/16 19:37	300
Ethylbenzene	ND		1500	600	ug/L			11/28/16 19:37	300
Xylenes, Total	ND		3000	1400	ug/L			11/28/16 19:37	300
m-Xylene & p-Xylene	ND		1500	580	ug/L			11/28/16 19:37	300
o-Xylene	ND		1500	870	ug/L			11/28/16 19:37	300
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		62 - 123					11/28/16 19:37	300
4-Bromofluorobenzene (Surr)	96		75 - 120					11/28/16 19:37	300
Dibromofluoromethane (Surr)	104		80 - 120					11/28/16 19:37	300
Toluene-d8 (Surr)	116		80 - 120					11/28/16 19:37	300

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		10	2.3	ug/L			11/28/16 11:15	11/29/16 13:20
Aluminum	20000		200	37	ug/L			11/28/16 11:15	11/29/16 12:23
Arsenic	ND		20	9.7	ug/L			11/28/16 11:15	11/29/16 13:20
Antimony	ND		10	3.2	ug/L			11/28/16 11:15	11/29/16 12:23
Barium	14 J		200	3.2	ug/L			11/28/16 11:15	11/29/16 12:23
Beryllium	3.8 J		4.0	0.42	ug/L			11/28/16 11:15	11/29/16 12:23
Cadmium	0.49 J		5.0	0.20	ug/L			11/28/16 11:15	11/29/16 12:23
Calcium	150000		5000	89	ug/L			11/28/16 11:15	11/29/16 12:23
Chromium	150		5.0	0.61	ug/L			11/28/16 11:15	11/29/16 12:23
Cobalt	150		50	0.51	ug/L			11/28/16 11:15	11/29/16 12:23
Copper	ND		25	3.4	ug/L			11/28/16 11:15	11/29/16 12:23
Iron	320000		100	41	ug/L			11/28/16 11:15	11/29/16 12:23
Lead	ND		10	3.1	ug/L			11/28/16 11:15	11/29/16 12:23
Magnesium	36000		5000	79	ug/L			11/28/16 11:15	11/29/16 12:23
Manganese	32000		30	2.3	ug/L			11/28/16 11:15	11/29/16 13:20
Nickel	300		40	3.2	ug/L			11/28/16 11:15	11/29/16 12:23
Potassium	2600 J		5000	620	ug/L			11/28/16 11:15	11/29/16 12:23
Selenium	ND		20	7.5	ug/L			11/28/16 11:15	11/29/16 13:20
Sodium	72000		5000	190	ug/L			11/28/16 11:15	11/29/16 12:23
Thallium	ND		40	5.3	ug/L			11/28/16 11:15	11/29/16 13:20

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 180-195597/7
Matrix: Water
Analysis Batch: 195597
Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	ND		5.0	3.0	ug/L			11/28/16 12:03	1
Toluene	ND		5.0	3.6	ug/L			11/28/16 12:03	1
Ethylbenzene	ND		5.0	2.0	ug/L			11/28/16 12:03	1
Xylenes, Total	ND		10	4.6	ug/L			11/28/16 12:03	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			11/28/16 12:03	1
o-Xylene	ND		5.0	2.9	ug/L			11/28/16 12:03	1
Surrogate	MB	MB							
	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	78			62 - 123				11/28/16 12:03	1
4-Bromofluorobenzene (Surr)	85			75 - 120				11/28/16 12:03	1
Dibromofluoromethane (Surr)	92			80 - 120				11/28/16 12:03	1
Toluene-d8 (Surr)	104			80 - 120				11/28/16 12:03	1

Lab Sample ID: LCS 180-195597/17
Matrix: Water
Analysis Batch: 195597
Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	MB	MB	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
	Result	Qualifier							
Benzene			40.0	34.8		ug/L		87	80 - 120
Toluene			40.0	41.0		ug/L		103	80 - 124
Ethylbenzene			40.0	34.8		ug/L		87	79 - 124
Xylenes, Total			80.0	72.3		ug/L		90	81 - 121
m-Xylene & p-Xylene			40.0	36.4		ug/L		91	78 - 124
o-Xylene			40.0	35.9		ug/L		90	78 - 124
Surrogate	MB	MB							
	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90			62 - 123					
4-Bromofluorobenzene (Surr)	94			75 - 120					
Dibromofluoromethane (Surr)	95			80 - 120					
Toluene-d8 (Surr)	101			80 - 120					

Lab Sample ID: 180-61091-4 MS
Matrix: Water
Analysis Batch: 195597
Client Sample ID: MW-159
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	D	%Rec	%Rec.	
	Result	Qualifier	Added	Result	Qualifier	Unit			
Benzene	36000	F1	60000	78500	F1	ug/L	71	80 - 120	
Toluene	ND		60000	62400		ug/L	104	80 - 124	
Ethylbenzene	ND		60000	53700		ug/L	90	79 - 124	
Xylenes, Total	ND		120000	112000		ug/L	93	81 - 121	
m-Xylene & p-Xylene	ND		60000	56300		ug/L	94	78 - 124	
o-Xylene	ND		60000	55400		ug/L	92	78 - 124	
Surrogate	MS	MS							
	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89			62 - 123					
4-Bromofluorobenzene (Surr)	97			75 - 120					
Dibromofluoromethane (Surr)	100			80 - 120					

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 180-61091-4 MS
Matrix: Water
Analysis Batch: 195597

Client Sample ID: MW-159
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	105		80 - 120

Lab Sample ID: 180-61091-4 MSD
Matrix: Water
Analysis Batch: 195597

Client Sample ID: MW-159
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec. Limits	RPD	RPD Limit
Benzene	36000	F1	60000	76800	F1	ug/L	68	80 - 120	2	20
Toluene	ND		60000	61500		ug/L	102	80 - 124	2	20
Ethylbenzene	ND		60000	53800		ug/L	90	79 - 124	0	25
Xylenes, Total	ND		120000	111000		ug/L	92	81 - 121	1	20
m-Xylene & p-Xylene	ND		60000	55800		ug/L	93	78 - 124	1	24
o-Xylene	ND		60000	55100		ug/L	92	78 - 124	0	22

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	82		62 - 123
4-Bromofluorobenzene (Surr)	92		75 - 120
Dibromofluoromethane (Surr)	96		80 - 120
Toluene-d8 (Surr)	101		80 - 120

Lab Sample ID: MB 180-195684/9
Matrix: Water
Analysis Batch: 195684

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			11/29/16 11:34	1
Toluene	ND		5.0	3.6	ug/L			11/29/16 11:34	1
Ethylbenzene	ND		5.0	2.0	ug/L			11/29/16 11:34	1
Xylenes, Total	ND		10	4.6	ug/L			11/29/16 11:34	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			11/29/16 11:34	1
o-Xylene	ND		5.0	2.9	ug/L			11/29/16 11:34	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		62 - 123		11/29/16 11:34	1
4-Bromofluorobenzene (Surr)	97		75 - 120		11/29/16 11:34	1
Dibromofluoromethane (Surr)	104		80 - 120		11/29/16 11:34	1
Toluene-d8 (Surr)	89		80 - 120		11/29/16 11:34	1

Lab Sample ID: LCS 180-195684/3
Matrix: Water
Analysis Batch: 195684

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec. Limits
Benzene	40.0	35.0		ug/L	88	80 - 120
Toluene	40.0	37.1		ug/L	93	80 - 124
Ethylbenzene	40.0	38.2		ug/L	95	79 - 124
Xylenes, Total	80.0	78.1		ug/L	98	81 - 121

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QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 180-195684/3

Matrix: Water

Analysis Batch: 195684

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte		Spike	LCS	LCS			%Rec.	Limits
		Added	Result	Qualifier	Unit	D	%Rec	
m-Xylene & p-Xylene		40.0	38.9		ug/L		97	78 - 124
o-Xylene		40.0	39.2		ug/L		98	78 - 124
<i>LCS</i>		<i>LCS</i>	<i>LCS</i>	<i>Qualifier</i>	<i>Limits</i>			
Surrogate		%Recovery		Qualifier				
1,2-Dichloroethane-d4 (Surr)		95			62 - 123			
4-Bromofluorobenzene (Surr)		97			75 - 120			
Dibromofluoromethane (Surr)		97			80 - 120			
Toluene-d8 (Surr)		91			80 - 120			

Lab Sample ID: LCSD 180-195684/4

Matrix: Water

Analysis Batch: 195684

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte		Spike	LCSD	LCSD			%Rec.	RPD	Limit	
		Added	Result	Qualifier	Unit	D	%Rec			
Benzene		40.0	33.9		ug/L		85	80 - 120	3	20
Toluene		40.0	36.7		ug/L		92	80 - 124	1	20
Ethylbenzene		40.0	38.2		ug/L		95	79 - 124	0	25
Xylenes, Total		80.0	77.8		ug/L		97	81 - 121	0	20
m-Xylene & p-Xylene		40.0	39.0		ug/L		98	78 - 124	0	24
o-Xylene		40.0	38.8		ug/L		97	78 - 124	1	22
<i>LCSD</i>		<i>LCSD</i>	<i>LCSD</i>	<i>Qualifier</i>	<i>Limits</i>					
Surrogate		%Recovery		Qualifier						
1,2-Dichloroethane-d4 (Surr)		94			62 - 123					
4-Bromofluorobenzene (Surr)		97			75 - 120					
Dibromofluoromethane (Surr)		96			80 - 120					
Toluene-d8 (Surr)		91			80 - 120					

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 180-195613/1-A

Matrix: Water

Analysis Batch: 195754

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 195613

Analyte	MB	MB			D	Prepared	Analyzed	Dil Fac
	Result	Qualifier	RL	MDL	Unit			
Silver	ND		5.0	1.2	ug/L	11/28/16 11:15	11/29/16 10:40	1
Aluminum	ND		200	37	ug/L	11/28/16 11:15	11/29/16 10:40	1
Arsenic	ND		10	4.8	ug/L	11/28/16 11:15	11/29/16 10:40	1
Antimony	ND		10	3.2	ug/L	11/28/16 11:15	11/29/16 10:40	1
Barium	ND		200	3.2	ug/L	11/28/16 11:15	11/29/16 10:40	1
Beryllium	ND		4.0	0.42	ug/L	11/28/16 11:15	11/29/16 10:40	1
Cadmium	ND		5.0	0.20	ug/L	11/28/16 11:15	11/29/16 10:40	1
Calcium	ND		5000	89	ug/L	11/28/16 11:15	11/29/16 10:40	1
Chromium	ND		5.0	0.61	ug/L	11/28/16 11:15	11/29/16 10:40	1
Cobalt	ND		50	0.51	ug/L	11/28/16 11:15	11/29/16 10:40	1
Copper	ND		25	3.4	ug/L	11/28/16 11:15	11/29/16 10:40	1
Iron	ND		100	41	ug/L	11/28/16 11:15	11/29/16 10:40	1
Lead	ND		10	3.1	ug/L	11/28/16 11:15	11/29/16 10:40	1

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QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-61091-4 MS

Matrix: Water

Analysis Batch: 195754

Client Sample ID: MW-159

Prep Type: Dissolved

Prep Batch: 195613

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits		
Chromium	11		200	202		ug/L		96	75 - 125		
Cobalt	26	J	500	538		ug/L		102	75 - 125		
Copper	ND		250	230		ug/L		92	75 - 125		
Iron	34000		1000	33400	4	ug/L	-61	75 - 125			
Lead	ND		500	501		ug/L		100	75 - 125		
Magnesium	45000		50000	91000		ug/L		92	75 - 125		
Nickel	58		500	566		ug/L		102	75 - 125		
Potassium	2500	J	50000	52400		ug/L		100	75 - 125		
Sodium	120000		50000	164000		ug/L		88	75 - 125		
Vanadium	ND		500	548		ug/L		110	75 - 125		
Zinc	23		500	508		ug/L		97	75 - 125		

Lab Sample ID: 180-61091-4 MS

Matrix: Water

Analysis Batch: 195754

Client Sample ID: MW-159

Prep Type: Dissolved

Prep Batch: 195613

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits		
Silver	ND		50.0	46.8		ug/L		94	75 - 125		
Arsenic	ND		500	489		ug/L		98	75 - 125		
Manganese	56000		500	53800	4	ug/L	-443	75 - 125			
Selenium	ND		500	496		ug/L		99	75 - 125		
Thallium	ND		500	500		ug/L		100	75 - 125		

Lab Sample ID: 180-61091-4 MSD

Matrix: Water

Analysis Batch: 195754

Client Sample ID: MW-159

Prep Type: Dissolved

Prep Batch: 195613

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	ND		2000	1940		ug/L		97	75 - 125	0	20
Antimony	ND		500	532		ug/L		106	75 - 125	0	20
Barium	35	J	2000	2000		ug/L		98	75 - 125	1	20
Beryllium	ND		50.0	50.1		ug/L		100	75 - 125	0	20
Cadmium	0.52	J	50.0	51.6		ug/L		102	75 - 125	0	20
Calcium	230000		50000	272000	4	ug/L		76	75 - 125	3	20
Chromium	11		200	203		ug/L		96	75 - 125	0	20
Cobalt	26	J	500	538		ug/L		102	75 - 125	0	20
Copper	ND		250	253		ug/L		101	75 - 125	10	20
Iron	34000		1000	33600	4	ug/L	-38	75 - 125	1	20	
Lead	ND		500	501		ug/L		100	75 - 125	0	20
Magnesium	45000		50000	91500		ug/L		93	75 - 125	1	20
Nickel	58		500	563		ug/L		101	75 - 125	0	20
Potassium	2500	J	50000	52500		ug/L		100	75 - 125	0	20
Sodium	120000		50000	166000		ug/L		93	75 - 125	1	20
Vanadium	ND		500	543		ug/L		109	75 - 125	1	20
Zinc	23		500	509		ug/L		97	75 - 125	0	20

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QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-61091-4 MSD

Matrix: Water

Analysis Batch: 195754

Client Sample ID: MW-159

Prep Type: Dissolved

Prep Batch: 195613

Analyte	Sample	Sample	Spike Added	MSD	MSD	Unit	D	%Rec.	%Rec.	RPD	RPD	Limit
	Result	Qualifier		Result	Qualifier							
Silver	ND		50.0	46.0		ug/L		92	75 - 125	2	20	
Arsenic	ND		500	497		ug/L		99	75 - 125	2	20	
Manganese	56000		500	54900	4	ug/L		-228	75 - 125	2	20	
Selenium	ND		500	519		ug/L		104	75 - 125	5	20	
Thallium	ND		500	484		ug/L		97	75 - 125	3	20	

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-195448/1-A

Matrix: Water

Analysis Batch: 195820

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 195448

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		0.20	0.052	ug/L		11/25/16 13:21	11/30/16 06:56	1

Lab Sample ID: LCS 180-195448/2-A

Matrix: Water

Analysis Batch: 195820

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 195448

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec.	%Rec.
		Result	Qualifier				
Mercury	2.50	2.25		ug/L		90	80 - 120

Lab Sample ID: 180-61091-4 MS

Matrix: Water

Analysis Batch: 195820

Client Sample ID: MW-159

Prep Type: Dissolved

Prep Batch: 195448

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec.	%Rec.
	Result	Qualifier		Result	Qualifier				
Mercury	ND		1.00	0.832		ug/L		83	75 - 125

Lab Sample ID: 180-61091-4 MSD

Matrix: Water

Analysis Batch: 195820

Client Sample ID: MW-159

Prep Type: Dissolved

Prep Batch: 195448

Analyte	Sample	Sample	Spike Added	MSD	MSD	Unit	D	%Rec.	%Rec.
	Result	Qualifier		Result	Qualifier				
Mercury	ND		1.00	0.907		ug/L		91	75 - 125

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

GC/MS VOA

Analysis Batch: 195597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-1	MW-162	Total/NA	Water	8260C	
180-61091-1 - DL	MW-162	Total/NA	Water	8260C	
180-61091-2	MW-120	Total/NA	Water	8260C	
180-61091-4	MW-159	Total/NA	Water	8260C	
180-61091-5	FB-01	Total/NA	Water	8260C	
180-61091-6	TB-01	Total/NA	Water	8260C	
180-61091-7	MW-163S	Total/NA	Water	8260C	
180-61091-8	MW-501S	Total/NA	Water	8260C	
180-61091-9	DUP-01	Total/NA	Water	8260C	
MB 180-195597/7	Method Blank	Total/NA	Water	8260C	
LCS 180-195597/17	Lab Control Sample	Total/NA	Water	8260C	
180-61091-4 MS	MW-159	Total/NA	Water	8260C	
180-61091-4 MSD	MW-159	Total/NA	Water	8260C	

Analysis Batch: 195684

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-3	MW-160	Total/NA	Water	8260C	
MB 180-195684/9	Method Blank	Total/NA	Water	8260C	
LCS 180-195684/3	Lab Control Sample	Total/NA	Water	8260C	
LCSD 180-195684/4	Lab Control Sample Dup	Total/NA	Water	8260C	

Metals

Prep Batch: 195448

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-1	MW-162	Dissolved	Water	7470A	
180-61091-2	MW-120	Dissolved	Water	7470A	
180-61091-3	MW-160	Dissolved	Water	7470A	
180-61091-4	MW-159	Dissolved	Water	7470A	
180-61091-5	FB-01	Dissolved	Water	7470A	
180-61091-7	MW-163S	Dissolved	Water	7470A	
180-61091-8	MW-501S	Dissolved	Water	7470A	
180-61091-9	DUP-01	Dissolved	Water	7470A	
MB 180-195448/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-195448/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-61091-4 MS	MW-159	Dissolved	Water	7470A	
180-61091-4 MSD	MW-159	Dissolved	Water	7470A	

Prep Batch: 195613

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-1	MW-162	Dissolved	Water	3005A	
180-61091-2	MW-120	Dissolved	Water	3005A	
180-61091-3	MW-160	Dissolved	Water	3005A	
180-61091-4	MW-159	Dissolved	Water	3005A	
180-61091-5	FB-01	Dissolved	Water	3005A	
180-61091-7	MW-163S	Dissolved	Water	3005A	
180-61091-8	MW-501S	Dissolved	Water	3005A	
180-61091-9	DUP-01	Dissolved	Water	3005A	
MB 180-195613/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-195613/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-61091-1

Metals (Continued)

Prep Batch: 195613 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-4 MS	MW-159	Dissolved	Water	3005A	
180-61091-4 MSD	MW-159	Dissolved	Water	3005A	

Analysis Batch: 195754

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-1	MW-162	Dissolved	Water	6010C	195613
180-61091-2	MW-120	Dissolved	Water	6010C	195613
180-61091-2	MW-120	Dissolved	Water	6010C	195613
180-61091-3	MW-160	Dissolved	Water	6010C	195613
180-61091-4	MW-159	Dissolved	Water	6010C	195613
180-61091-4	MW-159	Dissolved	Water	6010C	195613
180-61091-5	FB-01	Dissolved	Water	6010C	195613
180-61091-7	MW-163S	Dissolved	Water	6010C	195613
180-61091-7	MW-163S	Dissolved	Water	6010C	195613
180-61091-8	MW-501S	Dissolved	Water	6010C	195613
180-61091-8	MW-501S	Dissolved	Water	6010C	195613
180-61091-9	DUP-01	Dissolved	Water	6010C	195613
180-61091-9	DUP-01	Dissolved	Water	6010C	195613
MB 180-195613/1-A	Method Blank	Total Recoverable	Water	6010C	195613
LCS 180-195613/2-A	Lab Control Sample	Total Recoverable	Water	6010C	195613
180-61091-4 MS	MW-159	Dissolved	Water	6010C	195613
180-61091-4 MS	MW-159	Dissolved	Water	6010C	195613
180-61091-4 MSD	MW-159	Dissolved	Water	6010C	195613
180-61091-4 MSD	MW-159	Dissolved	Water	6010C	195613

Analysis Batch: 195771

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-8	MW-501S	Dissolved	Water	6010C	195613
180-61091-9	DUP-01	Dissolved	Water	6010C	195613

Analysis Batch: 195820

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-61091-1	MW-162	Dissolved	Water	7470A	195448
180-61091-2	MW-120	Dissolved	Water	7470A	195448
180-61091-3	MW-160	Dissolved	Water	7470A	195448
180-61091-4	MW-159	Dissolved	Water	7470A	195448
180-61091-5	FB-01	Dissolved	Water	7470A	195448
180-61091-7	MW-163S	Dissolved	Water	7470A	195448
180-61091-8	MW-501S	Dissolved	Water	7470A	195448
180-61091-9	DUP-01	Dissolved	Water	7470A	195448
MB 180-195448/1-A	Method Blank	Total/NA	Water	7470A	195448
LCS 180-195448/2-A	Lab Control Sample	Total/NA	Water	7470A	195448
180-61091-4 MS	MW-159	Dissolved	Water	7470A	195448
180-61091-4 MSD	MW-159	Dissolved	Water	7470A	195448

TestAmerica Pittsburgh

301 Alpha Drive

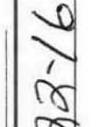
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TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Client Contact		Project Manager: John Hagle Tel/Fax: 412-931-2090		Regulatory Program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other:		Site Contact: John Hagle Lab Contact: <input type="checkbox"/>		Carrier: <input type="checkbox"/>		Date: 11-22-16 COC No: <input type="checkbox"/> of <input type="checkbox"/> COCs		
Company Name: Tetra Tech Address: 661 Andersson Drive City/State/Zip: Pittsbrgh, PA 15230 Phone: 412-221-7090 Fax: Project Name: Lyndell beaver valley Site: P O #:		Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input checked="" type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Performance MS/MSD (Y/N) <input type="checkbox"/> Filtered Sample (Y/N) <input type="checkbox"/> Dissolved Media		Barcode:  180-61091 Chain of Custody		Sampler: For Lab Use Only: Walk-in Client: <input type="checkbox"/>		Sample Specific Notes:		
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.						
MW-168	11-22-16	10:15	C	EW	4	1						
MW-120	11-22-16	09:05	C	EW	4	1						
MW-160	11-22-16	14:00	C	EW	4	1						
MW-159	11-22-16	12:45	C	EW	12	1						
FB - 01	11-22-16	10:35	C	EW	4	1						
TB - 01			L b	L b	X							
MW-163S	11-22-16	11:15	C	EW	4	1						
MW-105S	11-22-16	10:00	C	EW	4	1						
DUP - 01	11-22-16	09:00	C	EW	4	1						
Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other												
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.												
<input type="checkbox"/> Non-Hazard		<input type="checkbox"/> Flammable		<input type="checkbox"/> Skin Irritant		<input type="checkbox"/> Poison B		<input type="checkbox"/> Unknown		<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months		
Special Instructions/QC Requirements & Comments:												
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.: <input type="checkbox"/>		Custody Seal No.: <input type="checkbox"/>		Custody Seal No.: <input type="checkbox"/>		Custody Seal No.: <input type="checkbox"/>		Custody Seal No.: <input type="checkbox"/>		
Relinquished by: 		Company: <input type="checkbox"/> ReliaTech		Company: <input type="checkbox"/> ReliaTech		Company: <input type="checkbox"/> ReliaTech		Company: <input type="checkbox"/> ReliaTech		Company: <input type="checkbox"/> ReliaTech		
Relinquished by: 		Received by: <input type="checkbox"/> Julie Watson		Received by: <input type="checkbox"/> Julie Watson		Received by: <input type="checkbox"/> Julie Watson		Received by: <input type="checkbox"/> Julie Watson		Received by: <input type="checkbox"/> Julie Watson		
Relinquished by: 		Date/Time: <input type="checkbox"/> 11-22-16 10:10		Date/Time: <input type="checkbox"/> 11-22-16 10:10		Date/Time: <input type="checkbox"/> 11-22-16 10:10		Date/Time: <input type="checkbox"/> 11-22-16 10:10		Date/Time: <input type="checkbox"/> 11-22-16 10:10		

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Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 180-61091-1

Login Number: 61091

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: Watson, Debbie

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	